

# Package ‘raincpc’

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**Type** Package

**Title** Obtain and Analyze Daily Rainfall Data from the USA Climate Prediction Center (CPC)

**Version** 1.1.0

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**Description** The Climate Prediction Center's (CPC) rainfall data for the world (1979 to present, 50 km resolution) and the USA (1948 to present, 25 km resolution), is one of the few high quality, long term, observation based, daily rainfall products available for free. Although raw data is available at CPC's ftp site, obtaining, processing and visualizing the data is not straightforward. There are thousands of files, and file formats and file extensions have been changing over time. This package provides functionality to download, process and visualize over 40 years of global rainfall data and over 70 years of USA rainfall data from CPC.

**Imports** raster

**Suggests** knitr, ggplot2

**VignetteBuilder** knitr

**License** MIT + file LICENSE

**Encoding** UTF-8

**LazyData** true

**RoxygenNote** 7.0.2

**NeedsCompilation** no

**Repository** CRAN

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## R topics documented:

|                  |   |
|------------------|---|
| cpc_get_rawdata  | 2 |
| cpc_read_rawdata | 3 |

|                               |   |
|-------------------------------|---|
| raincpc . . . . .             | 4 |
| sdm_asc_from_raster . . . . . | 4 |
| sdm_as_asc . . . . .          | 5 |
| sdm_extract_data . . . . .    | 6 |
| sdm_getXYcoords . . . . .     | 7 |
| sdm_raster_from_asc . . . . . | 8 |

## Index 9

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|                 |  |
|-----------------|--|
| cpc_get_rawdata | <i>Download rainfall data from CPC for the time period of interest</i> |
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### Description

Download rainfall data from CPC for the time period of interest

### Usage

```
cpc_get_rawdata(begYr, begMo, begDay, endYr, endMo, endDay, usa = FALSE)
```

### Arguments

|        |  |
|--------|--|
| begYr  | beginning year of the time period of interest, 1979/1948 - present |
| begMo  | beginning month of the time period of interest, 1 - 12             |
| begDay | beginning day of the time period of interest, 1 - 28/29/30/31      |
| endYr  | ending year of the time period of interest, 1979/1948 - present    |
| endMo  | ending month of the time period of interest, 1 - 12                |
| endDay | ending day of the time period of interest, 1 - 28/29/30/31         |
| usa    | logical flag to indicate whether global or usa data is desired     |

### Value

downloads either a ".gz" file (2008 or before) or a ".bin" file (2009 - present)

### Author(s)

Gopi Goteti

### Examples

```
## Not run:
# CPC global data for July 3-5 2014
cpc_get_rawdata(2014, 7, 3, 2014, 7, 5)
# CPC USA data for July 3-5 2014
cpc_get_rawdata(2014, 7, 3, 2014, 7, 5, usa = TRUE)

## End(Not run)
```

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|                  |   |
|------------------|---|
| cpc_read_rawdata | <i>Read downloaded raw rainfall data from CPC</i> |
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**Description**

Read downloaded raw rainfall data from CPC

**Usage**

```
cpc_read_rawdata(  
  yr,  
  mo,  
  day,  
  raw_data_path = "",  
  usa = FALSE,  
  write_output = FALSE  
)
```

**Arguments**

|               |  |
|---------------|--|
| yr            | Year associated with the downloaded file, 1979/1948 - present                |
| mo            | Month associated with the downloaded file, 1 - 12                            |
| day           | Day associated with the downloaded file, 1 - 28/29/30/31                     |
| raw_data_path | location of downloaded cpc files   |
| usa           | logical flag to indicate whether global or usa data is desired               |
| write_output  | logical flag to indicate whether binary output file should be written or not |

**Details**

For the global data - the output matrix has 360 rows (latitudes) and 720 columns (longitudes) of rainfall/precipitation in units of mm/day; the first data point has the lat, lon values of -89.75 and 0.25 degrees, respectively; spatial resolution of the data is 0.5 degrees. For the USA data - the output matrix has 120 rows (latitudes) and 300 columns (longitudes) of rainfall/precipitation in units of mm/day; the first data point has the lat, lon values of 20.125 and 230.125 degrees, respectively; spatial resolution of the data is 0.25 degrees.

**Value**

RasterLayer

**Author(s)**

Gopi Goteti

## Examples

```
## Not run:  
# CPC global data for July 4 2014  
rain1 <- cpc_read_rawdata(2014, 7, 4)  
print(rain1)  
# CPC USA data for July 4 2014  
rain2 <- cpc_read_rawdata(2014, 7, 4, usa = TRUE)  
print(rain2)  
  
## End(Not run)
```

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raincpc

*Obtain and analyze rainfall data from the Climate Prediction Center.*

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## Description

Obtain and analyze rainfall data from the Climate Prediction Center.

## Details

The Climate Prediction Center's (CPC) rainfall data for the world (1979 to present, 50 km resolution) and the USA (1948 to present, 25 km resolution), is one of the few high quality, long term, observation based, daily rainfall products available for free. Although raw data is available at CPC's ftp site, obtaining, processing and visualizing the data is not straightforward. There are thousands of files, and file formats and file extensions have been changing over time. This package provides functionality to download, process and visualize over 40 years of global rainfall data and over 70 years of USA rainfall data from CPC.

## Author(s)

Gopi Goteti

## References

Climate Prediction Center's (CPC), <https://www.cpc.ncep.noaa.gov/>, daily rainfall data, ftp site [https://ftp.cpc.ncep.noaa.gov/precip/CPC\\_UNI\\_PRCP/](https://ftp.cpc.ncep.noaa.gov/precip/CPC_UNI_PRCP/)

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sdm\_asc\_from\_raster

*Raster conversion functions*

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## Description

Raster conversion functions

## Usage

```
sdm_asc_from_raster(x)
```

**Arguments**

x is an object of class 'RasterLayer'

**Details**

sdm\_asc\_from\_raster is an adaptation of asc.from.raster from SDMTools; extracts data from objects of class 'RasterLayer' (raster package) into an object of class 'asc'.

**Value**

Returns an object of class requested.

**Author(s)**

Gopi Goteti

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sdm\_as\_asc

*Raster conversion functions*


---

**Description**

Raster conversion functions

**Usage**

```
sdm_as_asc(x, xll = 1, yll = 1, cellsize = 1)
```

**Arguments**

x is an object of class 'matrix'  
xll is the lat center (not corner!) of lower-left grid  
yll is the lon center (not corner!) of lower-left grid  
cellsize is the resolution of the raster in decimal degrees

**Details**

sdm\_as\_asc is an adaptation of as.asc from SDMTools; extracts data from objects of class 'RasterLayer' (raster package) into an object of class 'asc'.

**Value**

Returns an object of class 'asc'.

**Author(s)**

Gopi Goteti

## Examples

```
## Not run:
#create a simple object of class 'asc'
tasc = sdm_as_asc(matrix(rep(x=1:10, times=1000),nr=100)); print(tasc)
str(tasc)

## End(Not run)
```

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sdm\_extract\_data      *Spatial Join of Points with Raster Grids*

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## Description

Spatial Join of Points with Raster Grids

## Usage

```
sdm_extract_data(pts, x)
```

## Arguments

|     |   |
|-----|---|
| pts | a two-column data frame or matrix with the x and y coordinates of the locations of interest.  |
| x   | a raster matrix of class 'asc' (this and the adehabitat package), 'RasterLayer' (raster package) or 'SpatialGridDataFrame' (sp package) |

## Details

sdm\_extract\_data is an adaptation of extract.data from SDMTools; extracts data from raster object of class 'asc' or 'RasterLayer' (raster package) at specified locations.

## Value

Returns a vector equal in length to the number of locations in pnts.

## Author(s)

Gopi Goteti

## Examples

```
## Not run:
#create a simple object of class 'asc'
tasc = as.asc(matrix(1:50,nr=50,nc=50)); print(tasc)

#define some point locations
points = data.frame(x=runif(25,1,50),y=runif(25,1,50))
```

```
#extract the data
points$values = sdm_extract_data(points, tasc)

#show the data
print(points)

## End(Not run)
```

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|                 |   |
|-----------------|---|
| sdm_getXYcoords | <i>Computes the X and Y Coordinates of the Pixels of a Raster Map</i> |
|-----------------|---|

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### Description

Computes the X and Y Coordinates of the Pixels of a Raster Map

### Usage

```
sdm_getXYcoords(w)
```

### Arguments

w                    an object of class asc.

### Details

sdm\_getXYcoords is an adaptation of getXYcoords from SDMTools; computes the geographical coordinates of the rows and columns of pixels of a raster map of class asc.

### Value

Returns a list with two components:

x                    the x coordinates of the columns of pixels of the map  
y                    the y coordinates of the rows of pixels of the map

### Author(s)

Gopi Goteti

### Examples

```
## Not run:
tasc = sdm_as_asc(matrix(rep(x=1:10, times=1000),nr=100)); print(tasc)
sdm_getXYcoords(tasc)

## End(Not run)
```

---

sdm\_raster\_from\_asc     *Raster conversion functions*

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**Description**

Raster conversion functions

**Usage**

```
sdm_raster_from_asc(x)
```

**Arguments**

x                    is an object of class 'asc'

**Details**

sdm\_raster\_from\_asc is an adaptation of raster.from.asc from SDMTools; creates an object of class 'RasterLayer' (raster package) from an object of class 'asc'.

**Value**

Returns an object of class requested.

**Author(s)**

Gopi Goteti

**Examples**

```
## Not run:
#create a simple object of class 'asc'
tasc = sdm_as_asc(matrix(rep(x=1:10, times=1000),nr=100)); print(tasc)
str(tasc)

#convert to RasterLayer
traster = sdm_raster_from_asc(tasc)
str(traster)

## End(Not run)
```



# Index

`cpc_get_rawdata`, 2  
`cpc_read_rawdata`, 3

`raincpc`, 4

`sdm_as_asc`, 5  
`sdm_asc_from_raster`, 4  
`sdm_extract_data`, 6  
`sdm_getXYcoords`, 7  
`sdm_raster_from_asc`, 8